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## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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To:

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Date of mailing (day/month/year) 02 May 2000 (02.05.00)	
International application No. PCT/EP99/06390	Applicant's or agent's file reference PC271AG
International filing date (day/month/year) 31 August 1999 (31.08.99)	Priority date (day/month/year) 01 September 1998 (01.09.98)
Applicant BASTIOLI, Catia et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
29 March 2000 (29.03.00)

☐ in a notice effecting later election filed with the International Bureau on:  
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2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>PC271AG</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 99/06390</b>	International filing date (day/month/year) <b>31/08/1999</b>	(Earliest) Priority Date (day/month/year) <b>01/09/1998</b>
Applicant <b>NOVAMONT S.P.A. et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.  
☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
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- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
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2. ☐ **Certain claims were found unsearchable** (See Box I).
3. ☐ **Unity of invention is lacking** (see Box II).
4. With regard to the **title**,
- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
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6. The figure of the **drawings** to be published with the abstract is Figure No.
- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☒ None of the figures.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 99/06390

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08L1/10 C08L1/12 C08L1/14 C08L3/00 C08L3/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DATABASE WPI Week 199524 Derwent Publications Ltd., London, GB; AN 1995-183084 XP002125675 "Biodegradable composn, useful for forming mouldings e.g.fibre, resin or film - contains cellulose ester, starch(es) and plasticiser and is easely moulded." &amp; JP 07 102114 A (TEIJIN LTD), 18 April 1995 (1995-04-18) abstract</p> <p style="text-align: center;">-/-</p>	1-9, 15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

21 January 2000

Date of mailing of the international search report

28/01/2000

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/06390

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MAYER J. ET AL.: "Biodegradable blends of cellulose acetate and starch: production and properties" JOURNAL OF MACROMOLECULAR SCIENCE, PURE AND APPLIED CHEMISTRY, vol. a32, no. 4, 1995, pages 775-785, XP000863347 us page 780, line 5 - line 12 page 777, line 1 - line 25 abstract	1,2,4-9, 14,15
A	EP 0 596 437 A (FLUNTERA AG) 11 May 1994 (1994-05-11) abstract; claims	1-3,6,7, 10-12,15
A	EP 0 722 980 A (NOVAMONT SPA) 24 July 1996 (1996-07-24) cited in the application abstract; claims	1-3,6,7, 10,12,15

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/06390

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 07102114 A	18-04-1995	NONE	
EP 596437 A	11-05-1994	DE 4237535 A	11-05-1994
		AT 158805 T	15-10-1997
		BR 9304477 A	26-07-1994
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>C08L 1/10, 1/12, 1/14, 3/00, 3/02</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/12616</b> <b>(43) International Publication Date:</b> 9 March 2000 (09.03.00)
<b>(21) International Application Number:</b> PCT/EP99/06390 <b>(22) International Filing Date:</b> 31 August 1999 (31.08.99) <b>(30) Priority Data:</b> TO98A000735 1 September 1998 (01.09.98) IT <b>(71) Applicant (for all designated States except US):</b> NOVAMONT S.p.A. [IT/IT]; Via G. Fauser, 8, I-28100 Novara (IT). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BASTIOLI, Catia [IT/IT]; Via della Noce, 63, I-28100 Novara (IT). LOMBI, Roberto [IT/IT]; Via Fara, 51, I-28100 Novara (IT). NICOLINI, Matteo [IT/IT]; Via Borgomanero, 82, I-28012 Cressa (IT). TOSIN, Maurizio [IT/IT]; Via San Giacomo, 6, I-13037 Serravalle Sesia (IT). DEGLI INNOCENTI, Francesco [IT/IT]; Corso Torino, 16, I-28100 Novara (IT). <b>(74) Agents:</b> GERBINO, Angelo et al.; Jacobacci & Perani S.p.A., Corso Regio Parco, 27, I-10152 Torino (IT).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> BIODEGRADABLE COMPOSITIONS COMPRISING STARCH AND POLYSACCHARIDE ESTERS		
<b>(57) Abstract</b> <p>The biodegradable heterophase compositions comprise partially or completely destructureized and/or complexed starch, a polysaccharide ester and a plasticizer for the polysaccharide ester. In these compositions, the polysaccharide ester constitutes the matrix and the starch the dispersed phase in the form of particles or domains of numeric mean dimension lower than 1 <math>\mu</math>m and preferably than 0.5 <math>\mu</math>m for at least 80 % of the particles. The compositions also comprise an additive which can increase and maintain at values of 4 or more the pH of a solution obtained by placing the compositions in pellet form in contact with water at ambient temperature for 1 hour, with the use of a pellet:water ratio of 1:10 by weight.</p>		

Biodegradable compositions comprising starch and polysaccharide esters

The present invention relates to biodegradable compositions comprising starch and polysaccharide esters, suitable for producing moulded articles which can decompose rapidly during composting.

It is reported in the literature that thin cellulose acetate films are rapidly degradable; however, the time required for the biodegradation of thick films or of articles with thick walls is extremely long. For example, two months are required to degrade less than 60% of a thick film.

The problem to be solved in the case of compositions containing starch and cellulose esters consists of the provision of compositions having good biodegradability which are suitable for the production of shaped articles having an adequate capacity to decompose during composting.

Compositions comprising starch and cellulose esters which have improved compatibility between the polymeric components but which do not have adequate biodegradability are described in the patent literature.

For example, EP-A-0 722 980 describes compositions in which the starch and the cellulose ester are rendered more compatible with one another with the use of specific phase compatibilizing agents which are selected from various classes of polymeric substances, and which - in addition to improving compatibility - also have the effect of improving biodegradability by virtue of the high level of dispersion conferred on the starch in the cellulose-ester matrix.

However, articles produced from the compositions still have too low a decomposition rate during composting.



It has now surprisingly been found that it is possible considerably to increase the biodegradability of articles produced from compositions comprising partially or completely deconstructurized and/or complexed starch and polysaccharide esters, preferably cellulose esters, and consequently their ability to decompose during composting.

The decomposition times for the articles produced can be reduced to less than two months in standard composting conditions.

The compositions of the present invention comprising starch and a polysaccharide ester and preferably a cellulose ester or a starch ester are characterized by a microstructure in which the ester constitutes the matrix and the fraction of deconstructurized and/or dispersed starch constitutes the dispersed phase, with a numeric mean dimension of the domains or dispersed particles of less than  $1\text{ }\mu\text{m}$ , preferably less than  $0.5\text{ }\mu\text{m}$ , and in that they contain an additive which can increase and maintain at values of 4 or more the pH of a solution obtained by immersing granules of the composition in water at ambient temperature for 1 hour with the use of a water:granules ratio of 10:1 by weight.

It is possible the presence of a portion of native crystalline starch up to 30% with respect to the starting starch content.

The additive, which has the above-mentioned capability to control the pH, has the effect of considerably increasing the biodegradability of the compositions by neutralizing the acid resulting from hydrolysis of the cellulose ester in composting conditions. Any substance insoluble in water and having the above-mentioned capability may be a suitable additive.

Examples of additives are carbonates and hydroxides of alkaline-earth metals such as  $\text{CaCO}_3$ ,  $\text{MgCO}_3$ ,  $\text{Mg}(\text{OH})_2$ .  $\text{CaCO}_3$  is the preferred additive.

The compositions comprise starch and the polysaccharide ester plasticized with a plasticizer in a quantity of from 10 to 40% by weight, in a ratio by weight of from 1:0.6 to 1:18, preferably from 1:2 to 1:3.

The additive is present in a quantity of from 0.5 to 30%, preferably from 5 to 20%, by weight relative to the weight of the starch and of the plasticized polysaccharide ester.

Quantities greater than 30% by weight may be used without any significant further improvement.

Too large a quantity of additive may have an adverse effect on the mechanical properties of the compositions.

In addition to the plasticizer for the polysaccharide ester phase, the compositions may also comprise a plasticizer for the starch phase, used in a quantity of from 0.5 to 50% by weight, relative to the weight of the starch.

To permit the production of a finely dispersed microstructure as indicated above, additives belonging to the following classes are used:

- a) polymers compatible with polysaccharide esters and/or starch, to which aliphatic or polyhydroxylated chains containing from 4 to 40 carbon atoms are grafted,
- b) copolymers of hydroxy-acids and/or diamines with 2-24 carbon atoms with aliphatic or aromatic diisocyanates or with epoxy compounds or anhydrides,

c) copolymers of aliphatic polyesters, polyamides, polyureas or polyalkylene glycols with aliphatic or aromatic diisocyanates,

d) polymers compatible with polysaccharide esters and/or starch to which polyols soluble in starch or polymers capable of complexing starch are grafted, and

e) polymers capable of complexing starch, such as ethylene/vinyl alcohol or ethylene/acrylic acid copolymers, aliphatic polyesters and polyamides.

The additives of type a) are preferably obtained by grafting aliphatic chains derived from vegetable or animal fats such as oleic, lauric, myristic, palmitic, stearic, linoleic and ricinoleic acids having terminal groups such as carboxyl groups, esters or salts to facilitate the grafting of the chains.

Examples of polymers compatible with the cellulose esters are:

- cellulose esters with various degrees of substitution (DS),
- starch esters with various DS values, such as acetates,
- starch esters with various DS values, such as products of the reaction of starch with ethylene or propylene glycol,
- partially hydrolyzed polyvinyl acetate,
- aliphatic polyesters and aliphatic/aromatic copolyesters.

The number of grafted chains is between 0.1 and 100, preferably from 0.2 to 50, more preferably from 0.3 to 20 grafted chains per 100 monomeric units in the polymeric chain.

Examples of additives of type b) and type c) are the copolymers which can be produced from aliphatic polyesters such as polycaprolactones and polyethylene succinates.

A caprolactone-urethane copolymer marketed by Goodrich with the trade mark Estane, grade 54351 is representative of the copolymers of class b).

The additives are present in quantities of from 0.1 to 20% by weight, preferably from 0.5 to 10%, relative to the sum of the weight of the starch and of the plasticized polysaccharide ester.

In addition to the components indicated above, the compositions of the invention may contain synthetic polymers in a quantity up to 30% by weight, preferably less than 10%, of polyvinyl alcohol, polyvinyl acetate, thermoplastic polyesters such as polycaprolactone, copolymers of caprolactone with isocyanates, polymers of lactic acid, polyethylene or polybutylene and, in general, polyalchylene adipate, sebacate, and azelate.

The starch which is used to prepare the composition is a natural starch extracted from various plants such as maize, wheat, potato, tapioca and cereal starch. The term starch also includes starches with a high amylopectin content ("waxy" starches), starches with a high amylose content, chemically and physically modified starches, starches in which the type and concentration of the cations associated with phosphate groups are modified, starch ethoxylate, starch acetates, cationic starches, hydrolyzed starches, oxidized and cross-linked starches.

The final composition contains starch which is partially or completely destructurized and/or complexed. As destructurized starch is intended starch which has lost its granular structure (that means absence of Maltese crosses

which is visible by optical microscopy in polarized light with magnification in the range of 250 - 700 x).

As complexed starch is intended starch showing a band in second derivative FTIR around at  $946 - 947 \text{ cm}^{-1}$  after removal of the cellulose or starch ester in chloroform (with high starch concentrations without extraction of the cellulose or starch ester) or showing also peaks around 12-13 and 20 of  $2\theta$  (2 theta) in X-ray diffraction experiments.

Representative cellulose and starch esters comprise cellulose acetates, propionates and/or butyrates with various degrees of substitution. Cellulose acetate with a DS of from 1.5 to 2.5 is preferred.

The plasticizer usable for the cellulose ester is preferably selected from the following compounds:

- glycerol esters with aliphatic acids containing up to 6 carbon atoms, particularly diacetin and triacetin,
- esters of citric acid, particularly trimethyl or triethyl citrate, as well as acetyl-triethyl citrate,
- dialkyl esters of tartaric acid,
- aliphatic-acid esters, lactones and lactides,
- dialkyl esters of aliphatic acids such as those obtained from oxalic, glutaric, adipic, sebacic, suberic, azelaic acids, preferably dibutyl adipate and dibutyl sebacate,
- dialkyl esters of aromatic acids in which the alkyl group contains from 1 to 10 carbon atoms, particularly dimethyl phthalate, diethyl phthalate, methoxyethyl phthalate and ethoxyethyl phthalate,
- polyethylene glycol adipate, glutarate or sebacate,
- alkyl and aryl phosphates, particularly triethyl and tricresyl phosphates,
- alkyl esters of fatty acids such as butyl oleate,

- polymeric plasticizers such as the products marketed under the trade marks Paraplex by Rohm and Haas, Admex by Arche Daniels Midland, and Flexol by Union Carbide,
- mixed aliphatic-aromatic esters of trimethylol propane and pentaerithritol, polyethylene glycols with alkyl phosphate termination.

The preferred plasticizers are those which act as plasticizers both for the starch phase and for the cellulose ester phase. Acetins belong to this preferred class.

The plasticizers for the starch comprise water, glycerol, glycerol ethoxylate, ethylene glycol or propylene glycol, polyethylene glycol, polypropylene glycol, 1,2-propandiol, 1,3-propandiol, 1,2-, 1,3-, 1,4-butandiol, 1,6-, 1,5-hexandiol, sorbitol diethoxylate, and trimethylolpropane monoethoxylate.

The starch is normally plasticized directly during the mixing stage in a mixture with all of the other components. However, it is also possible to use a two-stage method in which the starch phase and the cellulose phase are plasticized separately.

The preparation of the composition of the invention comprises the mixing of the components in a heated extruder or in any closed container which can ensure conditions of temperature and of shear stress adequate to render the starch and cellulose ester components compatible with one another from a rheological point of view, operating at a temperature of between 80 and 210°C in the presence of water and plasticizers.

The preferred method of preparing the compositions comprises:

- a first step consisting in passing the components through an extruder with times spent in the extruder of the order of from 2 to 50 seconds, during which the starch and the cellulose ester are subjected to bulking under the effect of the plasticizer and possibly of added water, operating at a temperature of between 80 and 180°C,
- a mixing step, during which the mixture of the previous step is subjected to shear stress conditions suitable in particular for rendering the viscosities of the molten cellulose ester and starch similar, if the starting viscosities are different,
- an optional degassing step to produce a molten mass with a water content of less than 6% by weight which ensures, amongst other things, that bubbles do not form in the extruded product. If expanded materials are to be produced, the water content may be higher than 6% and may reach 18-20% by weight.

The resulting molten material is extruded to form pellets from which articles are produced by means of any conventional technique, or the composition may be extruded directly to produce moulded or injection-moulded articles.

The compositions of the present invention are suitable for the production of foams, foamed extruded containers, foamed extruded sheets, moulded foams, injection-moulded articles such as toys and disposable cutlery and, in general, articles for any use which requires decomposition times no longer than two months during composting. The following examples are provided for illustrative purposes and not for limiting the scope of the invention.

#### Examples

Examples 1-4 are comparative examples; Examples 5-7 are in accordance with the invention.

(A) Mixing

The compositions of the examples were prepared with the use of a twin-screw APV extruder model 2030 with a diameter of 30 mm and with L:D=25. The temperature profile of the sixteen controlled-temperature zones was as follows:

60°C x 1 - 100°C x 1 - 180°C x 14.

The rate of rotation of the screw was 120 rpm.

(B) Injection moulding

The pellets produced by the extruder were supplied to a Sandretto Series 60 injection press to produce shaped test samples. The samples were examined with regard to their surface quality by optical microscopy or by SEM electron microscopy.

The samples were also tested to determine the biodegradation rate.

The results of the tests are given in Tables 1 and 2.



TABLE 1

	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7
Aceplast LS	75	44	44	44	38	38	38
CAB			44				
Diacetin	25			16	14	14	14
Epoxidized soya bean oil		16	16				
Maize starch		32	32	27	25	25	25
Acetylyzed starch with DS = 1.3					5		
Sorbilene (sorbitol ethoxylate)		7.8	7.8	7.8	7.8	7.8	7.8
Erucamide		0.2	0.2	0.2	0.2	0.2	0.2
SAC DS 1.3/laurate 4.6				5			
SAC DS 1.1/laurate 3.2					5		
Calcium carbonate					5	10	
Magnesium hydroxide							
Clay							10
Footnotes	a	B	c	a,d	a,d	a,d	a,d

(a) the material was tested for biodegradability (the results are given in Table 2)

(b) the test sample underwent severe delamination

(c) the test sample tended to delaminate

(d) the surface of the sample appeared homogeneous without apparent flakes.

All of the samples which had surface characteristics (d) had a microstructure, according to SEM, in which the dispersed starch phase was in the form of domains at least 80% of which had a numeric mean dimension of less than 0.3  $\mu\text{m}$ .

LEGEND

1) Aceplast LS is a cellulose acetate with a degree of substitution of 2.5, marketed by Società Acetati S.p.A., of Verbania, Italy.

2) CAB is a cellulose butyrate/acetate marketed by Eastman Chemicals under the mark CAB 831-20.

3) Acetylated starch with DS = 1.3 is produced by National Starch and is referred to as "78-0403 GDS-1233".

4) The additives indicated in the table were produced from starch acetate (SAC) with DS 1.3 and 2.1, by grafting lauryl radicals in quantities of 4.2 and 3.2 radicals per 100 monomeric units of SAC.

The grafting was carried out with the use of lauric acid chloride in dimethyl acetamide.

After neutralization with pyridine, the compatibilizing agent was precipitated with ethyl ether.

Biodegradability of the compositions

The biodegradability was tested by recording the loss of weight of the samples which were enclosed in a polypropylene net (with 1 mm mesh) and were incorporated in a substrate of an aged compost with 55% humidity and heated to 50°C in an incubator. A plurality of samples was loaded, that is, one sample per net so that the course of the degradation over time could be followed. For each sample, 50 g of compost was used. The results are given in Table 2.

TABLE 2

Percentage loss of weight undergone by the samples after 15, 60 and 150 days

Examples	15 days	60 days	150 days
1	18.6	23.1	26.3
4	29.8	39.1	51.7
6	40.0	>90.0	completely degraded
7	50.0	>90.0	completely degraded
8	35.0	>80.0	completely degraded

CLAIMS

1. Biodegradable heterophase compositions comprising partially or completely destructured and/or complexed starch, a polysaccharide ester, and a plasticizer for the polysaccharide ester, in which the polysaccharide ester constitutes the matrix and the starch the dispersed phase in the form of particles or domains of numeric mean dimension lower than 1  $\mu\text{m}$  for at least 80% of the particles, the compositions comprising an additive which can increase and maintain at values of 4 or more the pH of a solution obtained by placing the compositions in pellet form in contact with water at ambient temperature for 1 hour with the use of a pellet:water ratio of 1:10 by weight.
2. Biodegradable compositions according to Claim 1, in which the polysaccharide ester is a cellulose or a starch ester.
3. Biodegradable compositions according to Claim 1 or 2, in which the particles or domains of the dispersed phase have dimension lower than 0,5  $\mu\text{m}$ .
4. Biodegradable compositions according to any preceding Claim, in which the additive is selected from carbonates and hydroxides of alkaline-earth metals.
5. Biodegradable compositions according to Claim 4, in which the additive is selected from calcium and magnesium carbonates.
6. Biodegradable compositions according to any one of Claims 1 to 5, in which the polysaccharide ester is a cellulose acetate with a degree of substitution greater than 2, preferably greater than 2.4.

7. Biodegradable compositions according to any one of Claims 1 to 6, in which the plasticizer for the polysaccharide ester is present in a quantity of from 15 to 50% by weight relative to the weight of the polysaccharide ester.

8. Biodegradable compositions according to any one of Claims 1 to 7, in which the additive for regulating the pH is present in a quantity of from 0.5 to 30% by weight relative to the weight of the starch and of the plasticized cellulose ester.

9. Biodegradable compositions according to Claim 8, in which the additive is present in a quantity of from 5 to 15%.

10. Biodegradable compositions according to any one of Claims 1 to 9, comprising an additive selected from the group consisting of:

- polymers or copolymers compatible with the polysaccharide ester, grafted with aliphatic or polyhydroxylated chains containing from 4 to 40 carbon atoms,
- copolymers obtained from hydroxy-acids and diamines with 2-24 carbon atoms, aliphatic polyesters, polyamides, polyureas and polyalkylene glycols with aliphatic or aromatic diisocyanates,
- copolymers produced from polymers compatible with the polysaccharide esters by grafting polyols soluble in starch.

11. Biodegradable compositions according to Claim 10, in which the additive is used in a quantity of from 0.1 to 20% by weight relative to the weight of the starch and of the plasticized cellulose ester.

12. Biodegradable compositions according to any one of Claims 1 to 9, in which the additive is selected from the group consisting of a polymer or copolymer compatible with the cellulose ester grafted with a fatty acid selected from oleic, lauric, palmitic, stearic, erucic, linoleic and ricinoleic acids and a block copolymer between polycaprolactone and an aliphatic or aromatic diisocyanate.

13. Biodegradable compositions according to any one of Claims 1 to 12, comprising a plasticizer for the starch phase, used in a quantity of from 1 to 50% relative to the weight of the starch.

14. Biodegradable compositions according to any one of Claims 1 to 13, in which the ratio of plasticized cellulose-ester:starch is between 1:1 and 18:1 by weight.

15. Manufactured articles produced from the compositions of Claims 1 to 14.

16. Manufactured articles according to Claim 15, suitable for the production of foams, foamed extruded containers, foamed extruded sheets, moulded foams.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/06390

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

### Description, pages:

1-11 as received on 23/10/2000 with letter of 23/10/2000 ✓

### Claims, No.:

1-17 as received on 23/10/2000 with letter of 23/10/2000 ✓

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/06390

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1-17
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-17
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP99/06390

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1:** DATABASE WPI Week 199524 Derwent Publications Ltd., London, GB; AN 1995-183084 XP002125675 'Biodegradable composition, useful for forming mouldings e.g. fibre, resin or film - contains cellulose ester, starch(es) and plasticiser and is easily moulded.' & JP 07 102114 A (TEIJIN LTD), 18 April 1995
- D2:** MAYER J. ET AL.: 'Biodegradable blends of cellulose acetate and starch: production and properties' JOURNAL OF MACROMOLECULAR SCIENCE, PURE AND APPLIED CHEMISTRY, vol. a32, no. 4, 1995, pages 775-785, XP000863347 us

**1. Novelty**

The subject-matter of **claims 1-17** is novel over the available state of the art (Article 33(2) PCT).

**2. Inventive step**

2.1. The subject-matter of **claims 1-13** involve inventive step (Article 33(3) PCT).

D1, which is considered to represent the most relevant state of the art, discloses biodegradable compositions containing cellulose ester and starch in a weight ratio of 99:1 to 20:80, a plasticiser constituting 30-70 wt.% of the composition, and additives such as talc, CaCO<sub>3</sub> and MgCO<sub>3</sub> directed to the **increase of mechanical properties** such as strength (page 5, lines 6-13). These compositions are useful for forming moulded articles such as fibres, resins or films, and exhibit excellent biodegradability.

The subject-matter of claim 1 differs from D1 in the **compounding proportions** of the polysaccharide ester, the starch and the plasticiser, and in the **indication of a pH-regulating function of the additive**. Said additive is capable of controlling the pH, and

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP99/06390

thus considerably increases the biodegradability of the compositions by neutralising the acid resulting from hydrolysis of the cellulose ester in composting conditions.

The problem to be solved by the present invention may therefore be regarded as to find a different polysaccharide ester based composition exhibiting an improved biodegradability.

The solution proposed in claim 1 of the present application can be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

Even if some of the additives of D1 correspond to the pH regulating additives of the present application (calcium carbonate, magnesium carbonate, clay), there is **no suggestion in D1 regarding to the use of a pH regulating additive to improve biodegradability**. As a matter of fact, the improved biodegradability is achieved in D1 by using compounds having a similar structure which renders them especially compatible. Moreover, no indication is given in D1 concerning the effect of calcium and magnesium carbonate or of clay on the biodegradability of the compositions. Said additives are meant to increase mechanical properties.

Additionally, D1 insists on the proportions of cellulose ester, starch and plasticiser to be used, thus explicitly excluding domains which are not suitable for matters of biodegradability/compatibility of the cellulose ester and starch and moulding properties/stability of the compositions, and which contain the ranges claimed by the present application.

D2 is concerned with the effects of blending starch and propylene glycol with cellulose acetate on mechanical properties and biodegradability. 2,5-5,0% of calcium carbonate are added to improve mechanical properties and also to eliminate the taste and odour problems, by neutralising residual acetic acid released during extrusion. This does, however, not constitute an incentive for the skilled person to use calcium carbonate for improving biodegradability.

The subject-matter of claims 2-13, directed to preferred embodiments, is not obvious either (Article 33(3) PCT).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP99/06390

**2.2.** The subject-matter of **claims 14 and 15** directed to articles made of the composition claimed in claims 1-13, as well as **claims 16 and 17**, dealing with a method for increasing the biodegradability of said articles, are inventive (Article 33(3) PCT).

**3. Industrial applicability**

The subject-matter of present claims 1-17 appears to comply with the requirements of industrial applicability as stipulated in Article 33(4) PCT.

**Re Item VII**

**Certain defects in the international application**

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.

**Re Item VIII**

**Certain observations on the international application**

1. Claims 16 and 17 are lacking a back-reference to the product-claims 1-13. The features relating to the compounding proportions are indispensable in order to establish a clear difference between said claims and the prior art since the amount of additive plays a role also in the mechanical properties of the composition.

Moreover, a **use claim** of the form of claim 16 is to be regarded as equivalent to a **process claim** like claim 17. Accordingly, claim 17 is superfluous (see the Guidelines III-4.9 PCT).

2. The expression "partially or completely destructured and/or complexed starch" is obscure. The starch condition should be defined by means of its production process in view of technical advances in this field, thus requiring a proper delimitation of the scope of protection. The use of plasticisers and of water, as well as the passage through an extruder at elevated temperatures (from 80 to 180°C), are deemed to be responsible for the destructuring of the native starch.

September 20, 2002

Docket: 13929/122995

In re Application of: Catia BASTIOLI *et al.*  
Serial No. 09/786,189  
Filed: June 6, 2001

For: BIODEGRADABLE COMPOSITIONS COMPRISING STARCH  
AND POLYSACCHARIDE ESTERS

Enclosed:

1. Response To Office Action Including Amendment and Petition for Extension of Time for 3 months including Marked Up Amendments and 4 Exhibits with Certificate of Mailing (33 pp. 1<sup>st</sup> page in duplicate);
2. Check for \$920.00 to cover extension fee; and
3. Return postcard

KINDLY DATE STAMP AND RETURN TO  
ACKNOWLEDGE RECEIPT

AH:rb

Docket: 13929/122995

September 20, 2002

In re Application of: Catia BASTIOLI *et al.*  
Serial No. 09/786,189  
Filed: June 6, 2001

For: BIODEGRADABLE COMPOSITIONS COMPRISING STARCH  
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2. Check for \$920.00 to cover extension fee; and
3. Return postcard

KINDLY DATE STAMP AND RETURN TO  
ACKNOWLEDGE RECEIPT

AH:rb



FAX RECEIVED  
DEC 10 2002  
GROUP 1700

**PATENT COOPERATION TREATY**

09 / 7 8 6 1 8 9

28/3/2000

From the INTERNATIONAL SEARCHING AUTHORITY

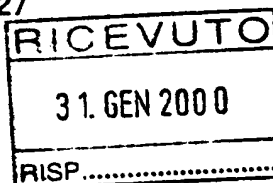
**PCT**

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

To:

JACOBACCI & PERANI S.P.A.  
Attn. Gerbino, Angelo  
Corso Regio Parco, 27  
10152 Torino  
ITALY



Date of mailing  
(day/month/year)

28/01/2000

Applicant's or agent's file reference

PC271AG

**FOR FURTHER ACTION**

See paragraphs 1 and 4 below

International application No.

PCT/EP 99/06390

International filing date  
(day/month/year)

31/08/1999

Applicant

NOVAMONT S.P.A. et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Alfredo Prein

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

#### What documents must/may accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

## NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

### "Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

### Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

### Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

09/786189

PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

<b>PCT/EP 99/00390</b> International Application No.	
(31 08. 1999)	31 AUG 1999
International Filing Date	
EUROPEAN PATENT OFFICE PCT INTERNATIONAL APPLICATION Name of receiving Office and "PCT International Application"	
Applicant's or agent's file reference (if desired) (12 characters maximum) PC271AG	

<b>Box No. I TITLE OF INVENTION</b> 'Biodegradable compositions comprising starch and polysaccharide esters'			
<b>Box No. II APPLICANT</b> Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)  NOVAMONT S.p.A. Via G. Fauser 8 I-28100 NOVARA IT		<input type="checkbox"/> This person is also inventor.  Telephone No.  Facsimile No.  Teleprinter No.	
State (that is, country) of nationality: IT	State (that is, country) of residence: IT		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
<b>Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)</b> Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)  BASTIOLI, Catia Via della Noce 63 I-28100 NOVARA IT			This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)
State (that is, country) of nationality: IT	State (that is, country) of residence: IT		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.			
<b>Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE</b> The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative			
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  GERBINO, Angelo (IT); JACOBACCI, Filippo (IT); JACOBACCI, Guido (IT); SACONNEY, Piero (IT); BOSOTTI, Luciano (IT); QUINTERNO, Giuseppe (IT); RAMBELLI, Paolo (IT); SERRA, Francesco (IT); FIORAVANTI, Corrado (IT); JACOBACCI & PERANI S.p.A., Corso Regio Parco 27, I-10152 TORINO (Italy)		Telephone No. (39) (011) 2440311  Facsimile No. (39) (011) 286300 / 286676  Teleprinter No.	
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.			



Sheet No. 2

## Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

LOMBI, Roberto  
Via Fara 51  
I-28100 NOVARA  
IT

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality: IT

State (that is, country) of residence: IT

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

NICOLINI, Matteo  
Via Borgomanero 82  
I-28012 CRESSA (Novara)  
IT

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality: IT

State (that is, country) of residence: IT

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

TOSIN, Maurizio  
Via San Giacomo 6  
I-13037 SERRAVALLE SESIA (Vercelli)  
IT

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality: IT

State (that is, country) of residence: IT

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

DEGLI INNOCENTI, Francesco  
Corso Torino 16  
I-28100 NOVARA  
IT

This person is:

- ☐ applicant only  
☒ applicant and inventor  
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality: IT

State (that is, country) of residence: IT

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

**Box No.V DESIGNATION OF STATES**

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked).

**Regional Patent**

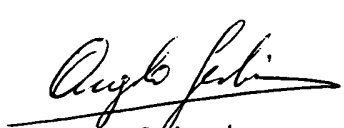
- ☒ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> <b>AE</b> United Arab Emirates                  | <input checked="" type="checkbox"/> <b>LR</b> Liberia  |  |
| <input checked="" type="checkbox"/> <b>AL</b> Albania                               | <input checked="" type="checkbox"/> <b>LS</b> Lesotho  |  |
| <input checked="" type="checkbox"/> <b>AM</b> Armenia                               | <input checked="" type="checkbox"/> <b>LT</b> Lithuania  |  |
| <input checked="" type="checkbox"/> <b>AT</b> Austria                               | <input checked="" type="checkbox"/> <b>LU</b> Luxembourg   |  |
| <input checked="" type="checkbox"/> <b>AU</b> Australia                             | <input checked="" type="checkbox"/> <b>LV</b> Latvia   |  |
| <input checked="" type="checkbox"/> <b>AZ</b> Azerbaijan                            | <input checked="" type="checkbox"/> <b>MD</b> Republic of Moldova  |  |
| <input checked="" type="checkbox"/> <b>BA</b> Bosnia and Herzegovina                | <input checked="" type="checkbox"/> <b>MG</b> Madagascar   |  |
| <input checked="" type="checkbox"/> <b>BB</b> Barbados                              | <input checked="" type="checkbox"/> <b>MK</b> The former Yugoslav Republic of Macedonia                      |  |
| <input checked="" type="checkbox"/> <b>BG</b> Bulgaria                              |  |  |
| <input checked="" type="checkbox"/> <b>BR</b> Brazil                                | <input checked="" type="checkbox"/> <b>MN</b> Mongolia   |  |
| <input checked="" type="checkbox"/> <b>BY</b> Belarus                               | <input checked="" type="checkbox"/> <b>MW</b> Malawi   |  |
| <input checked="" type="checkbox"/> <b>CA</b> Canada                                | <input checked="" type="checkbox"/> <b>MX</b> Mexico   |  |
| <input checked="" type="checkbox"/> <b>CH and LI</b> Switzerland and Liechtenstein  | <input checked="" type="checkbox"/> <b>NO</b> Norway   |  |
| <input checked="" type="checkbox"/> <b>CN</b> China                                 | <input checked="" type="checkbox"/> <b>NZ</b> New Zealand  |  |
| <input checked="" type="checkbox"/> <b>CU</b> Cuba                                  | <input checked="" type="checkbox"/> <b>PL</b> Poland   |  |
| <input checked="" type="checkbox"/> <b>CZ</b> Czech Republic                        | <input checked="" type="checkbox"/> <b>PT</b> Portugal   |  |
| <input checked="" type="checkbox"/> <b>DE</b> Germany                               | <input checked="" type="checkbox"/> <b>RO</b> Romania  |  |
| <input checked="" type="checkbox"/> <b>DK</b> Denmark                               | <input checked="" type="checkbox"/> <b>RU</b> Russian Federation   |  |
| <input checked="" type="checkbox"/> <b>EE</b> Estonia                               | <input checked="" type="checkbox"/> <b>SD</b> Sudan  |  |
| <input checked="" type="checkbox"/> <b>ES</b> Spain                                 | <input checked="" type="checkbox"/> <b>SE</b> Sweden   |  |
| <input checked="" type="checkbox"/> <b>FI</b> Finland                               | <input checked="" type="checkbox"/> <b>SG</b> Singapore  |  |
| <input checked="" type="checkbox"/> <b>GB</b> United Kingdom                        | <input checked="" type="checkbox"/> <b>SI</b> Slovenia   |  |
| <input checked="" type="checkbox"/> <b>GD</b> Grenada                               | <input checked="" type="checkbox"/> <b>SK</b> Slovakia   |  |
| <input checked="" type="checkbox"/> <b>GE</b> Georgia                               | <input checked="" type="checkbox"/> <b>SL</b> Sierra Leone   |  |
| <input checked="" type="checkbox"/> <b>GH</b> Ghana                                 | <input checked="" type="checkbox"/> <b>TJ</b> Tajikistan   |  |
| <input checked="" type="checkbox"/> <b>GM</b> Gambia                                | <input checked="" type="checkbox"/> <b>TM</b> Turkmenistan   |  |
| <input checked="" type="checkbox"/> <b>HR</b> Croatia                               | <input checked="" type="checkbox"/> <b>TR</b> Turkey   |  |
| <input checked="" type="checkbox"/> <b>HU</b> Hungary                               | <input checked="" type="checkbox"/> <b>TT</b> Trinidad and Tobago  |  |
| <input checked="" type="checkbox"/> <b>ID</b> Indonesia                             | <input checked="" type="checkbox"/> <b>UA</b> Ukraine  |  |
| <input checked="" type="checkbox"/> <b>IL</b> Israel                                | <input checked="" type="checkbox"/> <b>UG</b> Uganda   |  |
| <input checked="" type="checkbox"/> <b>IN</b> India                                 | <input checked="" type="checkbox"/> <b>US</b> United States of America                                       |  |
| <input checked="" type="checkbox"/> <b>IS</b> Iceland                               |  |  |
| <input checked="" type="checkbox"/> <b>JP</b> Japan                                 | <input checked="" type="checkbox"/> <b>UZ</b> Uzbekistan   |  |
| <input checked="" type="checkbox"/> <b>KE</b> Kenya                                 | <input checked="" type="checkbox"/> <b>VN</b> Viet Nam   |  |
| <input checked="" type="checkbox"/> <b>KG</b> Kyrgyzstan                            | <input checked="" type="checkbox"/> <b>YU</b> Yugoslavia   |  |
| <input checked="" type="checkbox"/> <b>KP</b> Democratic People's Republic of Korea | <input checked="" type="checkbox"/> <b>ZA</b> South Africa   |  |
|   | <input checked="" type="checkbox"/> <b>ZW</b> Zimbabwe   |  |
| <input checked="" type="checkbox"/> <b>KR</b> Republic of Korea                     | Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet: |  |
| <input checked="" type="checkbox"/> <b>KZ</b> Kazakhstan                            | <input checked="" type="checkbox"/> <b>CR</b> Costa Rica   |  |
| <input checked="" type="checkbox"/> <b>LC</b> Saint Lucia                           | <input checked="" type="checkbox"/> <b>DM</b> Dominica   |  |
| <input checked="" type="checkbox"/> <b>LK</b> Sri Lanka                             |  |  |

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

See Notes to the request form

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) (01.09.1998) 1 SEPTEMBER 1998	TO98A000735	ITALY		
item (2)				
item (3)				
<input type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):				
<small>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</small>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
<b>Choice of International Searching Authority (ISA)</b> <small>(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):</small>		<b>Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):</b> Date (day/month/year)      Number      Country (or regional Office)		
ISA / EP				
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets: request : 4 description (excluding sequence listing part) : 12 claims : 3 abstract : 1 drawings : sequence listing part of description : Total number of sheets : 20		This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input checked="" type="checkbox"/> separate signed power of attorney (follows) 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input checked="" type="checkbox"/> priority document(s) identified in Box No. VI as item(s): (1) TO FOLLOW 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input type="checkbox"/> other (specify):		
Figure of the drawings which should accompany the abstract:		Language of filing of the international application: English		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).				
 GERBINO Angelo				
For receiving Office use only				
1. Date of actual receipt of the purported international application:		31 AUG 1999 (31.08.99)		2. Drawings: <input type="checkbox"/> received:  <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:				
4. Date of timely receipt of the required corrections under PCT Article 11(2):				
5. International Searching Authority (if two or more are competent): ISA /		6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.		
For International Bureau use only				
Date of receipt of the record copy by the International Bureau:				

# PATENT COOPERATION TREATY

PCT/EP/332/332  
Bee

PCT

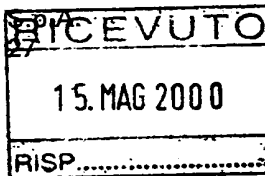
## INFORMATION CONCERNING ELECTED OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

From the INTERNATIONAL BUREAU

To:

GERBINO, Angelo  
Jacobacci & Perani  
Corso Regio Parco,  
I-10152 Torino  
ITALIE



Date of mailing (day/month/year) 02 May 2000 (02.05.00)		
Applicant's or agent's file reference PC271AG		IMPORTANT INFORMATION
International application No. PCT/EP99/06390 ✓	International filing date (day/month/year) 31 August 1999 (31.08.99) ✓	
Applicant NOVAMONT S.P.A. et al ✓		Priority date (day/month/year) 01 September 1998 (01.09.98) ✓

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

AP : GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW  
EP : AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE  
National : AU, BG, BR, CA, CN, CZ, DE, IL, JP, KP, KR, MN, NO, NZ, PL, RO, RU, SE, SK, US ✓

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
OA : BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG  
National : AE, AL, AM, AT, AZ, BA, BB, BY, CH, CR, CU, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM,  
HR, HU, ID, IN, IS, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MW, MX, PT, SD, SG, SI,  
SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW ✓

3. The applicant is reminded that he must enter the "national phase" before the expiration of 30 months from the priority date before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

The entry into the European regional phase is postponed until 31 months from the priority date for all States designated for the purposes of obtaining a European patent.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: C. Villet
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

PATENT COOPERATION TREATY

09/786189

PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

GERBINO, Angelo  
Jacobacci & Perani S.p.A.  
Corso Regio Parco, 27  
I-10152 Torino  
ITALIE

RICEVUTO

17.MAR 2000

RISP.....

Date of mailing (day/month/year) 09 March 2000 (09.03.00)		Applicant's or agent's file reference PC271AG		IMPORTANT NOTICE
International application No. PCT/EP99/06390 ✓	International filing date (day/month/year) 31 August 1999 (31.08.99)	Priority date (day/month/year) 01 September 1998 (01.09.98) ✓		
Applicant NOVAMONT S.P.A. et al ✓				

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:  
AU,CN,EP,JP,KP,KR,US ✓

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:  
AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CR,CU,CZ,DE,DK,DM,EA,EE,ES,FI,GB,GD,GE,GH,  
GM,HR,HU,ID,IL,IN,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MN,MW,MX,NO,NZ,OA,PL,  
PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,UA,UG,UZ,VN,YU,ZA,ZW ✓  
The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).
3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on  
09 March 2000 (09.03.00) under No. WO 00/12616

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

Continuation of Form PCT/IB/308

**NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF  
THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES**

<b>Date of mailing (day/month/year)</b> 09 March 2000 (09.03.00)	<b>IMPORTANT NOTICE</b>
<b>Applicant's or agent's file reference</b> PC271AG	<b>International application No.</b> PCT/EP99/06390
<p>The applicant is hereby notified that, at the time of establishment of this Notice, the time limit under Rule 46.1 for making amendments under Article 19 has not yet expired and the International Bureau had received neither such amendments nor a declaration that the applicant does not wish to make amendments.</p>	

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

09/786189

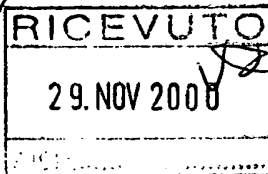
PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

To:

Gerbino, Angelo  
JACOBACCI & PERANI S.P.A.  
Corso Regio Parco, 27  
10152 Torino  
ITALIE



Date of mailing  
(day/month/year) 27.11.2000

Applicant's or agent's file reference  
PC271AG

## IMPORTANT NOTIFICATION

International application No.  
PCT/EP99/06390

International filing date (day/month/year)  
31/08/1999

Priority date (day/month/year)  
01/09/1998

Applicant  
NOVAMONT S.P.A. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

## 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Authorized officer

Aperribay, I

Tel. +49 89 2399-8154




# PATENT COOPERATION TREATY 99/786189

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>PC271AG</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/EP99/06390</b> ✓	International filing date (day/month/year) <b>31/08/1999</b> ✓	Priority date (day/month/year) <b>01/09/1998</b> ✓
International Patent Classification (IPC) or national classification and IPC <b>C08L1/10</b>		
Applicant <b>NOVAMONT S.P.A. et al.</b>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 15 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I    <input checked="" type="checkbox"/> Basis of the report</li> <li>II   <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV   <input type="checkbox"/> Lack of unity of invention</li> <li>V    <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI   <input type="checkbox"/> Certain documents cited</li> <li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>		
Date of submission of the demand  <b>29/03/2000</b>	Date of completion of this report  <b>27.11.2000</b>	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  <b>Gerber, M</b>  Telephone No. +49 89 2399 8528	





The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ \_\_\_\_\_

# PCT

## CHAPTER II

### DEMAND

under Article 31 of the Patent Cooperation Treaty:  
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>	
Applicant's or agent's file reference PC271AG	
International application No. PCT/EP99/06390	International filing date (day/month/year) 31 August 1999 (31.08.1999)
(Earliest) Priority date (day/month/year) 01 September 1998 (01.09.1998)	
Title of invention "Biodegradable compositions comprising starch and polysaccharide esters"	
<b>Box No. II APPLICANT(S)</b>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  NOVAMONT S.p.A. Via G. Fauser 8 I-28100 NOVARA (Italy)	Telephone No.:  Facsimile No.:  Teleprinter No.:
State (that is, country) of nationality: IT	State (that is, country) of residence: IT
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  BASTIOLI, Catia Via della Noce 63 I-28100 NOVARA (Italy)	
State (that is, country) of nationality: IT	State (that is, country) of residence: IT
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)  LOMBI, Roberto Via Fara 51 I-28100 NOVARA (Italy)	
State (that is, country) of nationality: IT	State (that is, country) of residence: IT
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Sheet No. 2.

International application No.

PCT/EP99/06390

## Continuation of Box No. II APPLICANT(S)

*If none of the following sub-boxes is used, this sheet should not be included in the demand.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

NICOLINI, Matteo  
Via Borgomanero 82  
I-28012 CRESSA (Novara)  
Italy

State (that is, country) of nationality:

IT

State (that is, country) of residence:

IT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

TOSIN, Maurizio  
Via San Giacomo 6  
I-13037 SERRAVALLE SESIA (Vercelli)  
Italy

State (that is, country) of nationality:

IT

State (that is, country) of residence:

IT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DEGLI INNOCENTI, Francesco  
Corso Torino 16  
I-28100 NOVARA (Italy)

State (that is, country) of nationality:

IT

State (that is, country) of residence:

IT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

☐

Further applicants are indicated on another continuation sheet.

**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

GERBINO, Angelo

c/o JACOBACCI &amp; PERANI S.p.A.

Corso Regio Parco 27

I-10152 TORINO (Italy)

Telephone No.:

+39 +011 2440311

Facsimile No.:

+39 +011 286300 / 286676

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☐ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

**Box No. VI CHECK LIST**

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- |  |   |        |
|--|---|--------|
| 1. translation of international application                              | : | sheets |
| 2. amendments under Article 34   | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19  | : | sheets |
| 5. letter  | : | sheets |
| 6. other (specify)   | : | sheets |

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received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- |  |   |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet                             | 4. <input type="checkbox"/> statement explaining lack of signature                                  |
| 2. <input type="checkbox"/> separate signed power of attorney                            | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney, reference number, if any: | 6. <input type="checkbox"/> other (specify):  |

**Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

  
GERBINO, Angelo

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1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

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Demand received from IPEA on: